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ABSTRACT

The mechanisms by which adults acquire vocabulary and the relationship between adults' ability to acquire vocabulary and their method of processing information were the subjects of this study. Theoretical bases of the study were ideas from cognitive psychology, particularly the work of Sternberg. Subjects were preservice education majors and inservice teachers enrolled as graduate students in education at a medium-sized college in the rural west. The study correlated performance on three measures: Schmeck's Learning Styles Inventory, the Farr Assessment of Vocabulary Acquisition, and a vocabulary test used to predict performance on the Graduate Record Exam. The 135 subjects in 7 classes were grouped according to type of class. Three data analyses were conducted: Group 1, secondary English majors; Group 2, elementary education majors; and Group 3, master's students in education. Pearson correlation coefficients provided weak support for the hypothesized positive linear relationship between the tendency to process information deeply and the ability to acquire vocabulary and the hypothesized relationship of these to actual vocabulary knowledge. Regression analyses for Groups 2 and 3 indicated that the predictor variables used in the study (learning processes and ability to acquire vocabulary in context) explained a portion of the variance in the criterion variable, vocabulary. Findings implied that cultural context must be taken into account when assessing vocabulary. (10 references) (YLB)

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The Relationship Between Learning
Styles and Differential Performance on Verbal
Learning Tasks by Adult Students

Le Rapport Entre Les Styles d'Apprentissage
et d'Accomplissement Différentiel sur les Tâches
d'Apprentissage Verbales par les Adultes (élevés)

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Abstract

It is the purpose of this paper to report on a study examining the mechanisms by which adults acquire vocabulary and to explore the relationship between adults' ability to acquire vocabulary and their method of processing information.

Le but de ce travail est de présenter une étude sur les mécanismes par lesquels les adultes acquièrent leur vocabulaire, et de explorer les rapports entre les aptitudes des adultes pour acquérir leur vocabulaire et leur méthode pour traiter l'information.

Since 1923 when Spearman pointed out the importance of vocabulary to intelligence by suggesting it was probably the single best predictor of general intelligence and, hence, academic achievement, vocabulary has played a prominent role in educational measurement. In fact, the major individual test of adult intelligence, the Wechsler Adult Intelligence Scale, has vocabulary as a principal component. Yet an adult's vocabulary is not primarily the result of direct instruction. On the contrary, "the vocabulary that is directly taught is apt to be the vocabulary that is most likely to be forgotten" (Sternberg, 1987, p. 184). This circumstance creates a dilemma for adult educators which cannot be ignored. That vocabulary is important, but not easily taught directly, implies that there is nothing educators can do for those with poor vocabulary skills. To resolve the dilemma necessitates an honest appraisal of the issue of vocabulary acquisition and a concerted effort to understand, articulate, and address the factors that contribute to vocabulary instruction.

Purpose

Therefore, it is the purpose of this paper to report on a study examining the mechanisms by which adults acquire vocabulary and to explore the relationship between adults' ability to acquire vocabulary and their method of processing information.

Theoretical Background

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The theoretical foundations behind the conceptualization of this study are based upon ideas emanating from cognitive psychology, particularly the work of Sternberg (1985, 1986, 1987). Fundamental to this work is the assumption that intelligence is a constructive process, involving interaction between the individual and the environment and the integration of his/her perceptions with knowledge stored in long-term memory.

In his Triarchic Theory of Intelligence, Sternberg (1985) suggests that intelligence is composed of three elements: contextual, experiential, and componential. These elements correspond to the fact that intelligence is relative to a specific sociocultural context, that individuals' experiences differ within that context, and that three information processing components are represented in intelligence, respectively. Sternberg proposes these three information processing components: metacomponents, performance components, and knowledge-acquisition components. It is with the last of these that this paper is most concerned.

The knowledge-acquisition components, selective encoding, selective comparison, and selective combination, are the processes used in learning new information. Selective encoding is the ability to separate relevant from irrelevant information in a task. Selective comparison is the ability to relate old and new information. Selective combination is the ability to combine the information in some meaningful and appropriate way. "When an individual encounters an unknown word, in text or in conversation, it is necessary to determine what cues are available from the context (selective encoding), to draw from memory any pertinent information regarding either the cues or the word, such as other contexts in which the word was used (selective comparison), and to synthesize this information in order to ascertain the lexical meaning of the word (selective combination) (Farr & Moore, 1989, p. 17).

Despite the fact that vocabulary is a very strong predictor of intelligence, there is not a one-to-one correlation between vocabulary acquisition and intelligence, as currently measured. This is so because there are other factors involved in vocabulary acquisition besides knowledge-acquisition components. For example, sociocultural environment influences which words a child is exposed to, as well as how much vocabulary acquisition is valued, and, thus, how motivated an individual is to learn new words.

This last point is critical because it illustrates two aspects of the dilemma adult educators face. 1) Some individuals are more inclined, because of their sociocultural environment, to learn vocabulary. 2) Consequently, some individuals are more inclined to learn in general. Vocabulary is a reflection of what one has learned, but also it affects what one is able to learn. In other words, vocabulary itself empowers one to learn. This makes understanding the processes by which individuals acquire vocabulary all the more important.

Werner and Kaplan (1967) were among the first to develop a task meant to assess the processes by which individuals acquire vocabulary. In their paradigm, subjects were given a neologism (imaginary word) followed by six sentences utilizing that word. Using contextual cues, the subjects were asked to infer the meaning

of the word from the way it was used in the six sentences. The results of their study indicate that subjects tended to make different kinds of errors on the task, depending on their skill level.

Van Daalen-Kaptiejns and Elshout-Mohr (1981) expanded the work of Werner and Kaplan by having subjects state out loud the thinking processes they were going through as they tried to define the words. Their work confirmed the fact that performance level was a factor, that low verbals tended to use different strategies than high verbals in performing the task. Their work also confirmed the fact that one of the characteristics which distinguished high verbals from low verbals was the ability to decontextualize, or to focus on the lexical meaning of the words. For example, high verbals would read each sentence and adjust their conjecture as to the meaning of the word depending on the meaning suggested by each ensuing sentence. Low verbals would substitute a synonym for the neologism in the first sentence and then continue to use that synonym even if it meant changing the meaning of the following sentences.

The notion that processing strategies differentiated high verbals from low verbals led to this study. In looking for some possible factors that would account for these differences, the authors recalled Schmeck and others' work on learning styles. Schmeck posits that individuals tend to rely on certain learning strategies regardless of the specific demands of the learning tasks. Although, he outlines four styles, only two were considered here because of the similarity between them and the description of the strategies detailed in van Daalen-Kaptiejns and Elshout-Mohr. Notably, those who tend to expand on information and relate it to their own personal experiences and/or to concrete ideas are said to be elaborators; those who critically analyze and classify information are said to be deep processors.

Two themes which surface in all of the vocabulary studies is the concept of context and level of performance. This study explores both of those themes. Looking first at context, Sternberg suggests that vocabulary is acquired tacitly, in the context of our experiences. Werner and Kaplan have shown that individuals vary in the degree to which they are able to use that context to learn, and van Daalen-Kapteijs and Elshout-Mohr suggest this is due to the way they process information.

Looking at performance level, as has already been mentioned, types of errors differed depending on the verbal skill level of the subjects. This makes sense in light of a study by Marshalek (1981) indicating that younger subjects may have partial concepts of words and that vocabulary acquisition is a gradual process, occurring over time.

Particularly pertinent to this argument is the finding by Marshalek that reasoning ability is related to vocabulary at the lower end of the vocabulary difficulty distribution, but not at the higher end. In other words, a certain level of reasoning ability is necessary in order to decontextualize word meaning, but beyond that it does not make a difference; other factors come into play at the higher level of vocabulary difficulty distribution.

This study anticipates the possibility that these reasoning

skills can be explicitly taught (Sternberg, 1986) and seeks to gather evidence supporting or refuting these claims.

Methods

The study was a descriptive study correlating performance by adult students on three measures: an assessment of vocabulary acquisition, a learning styles inventory, and a vocabulary test used to predict performance on standardized achievement tests. The two vocabulary tests are distinguished from one another in that the former is indicative of the process by which vocabulary is acquired and the latter is indicative of the product of vocabulary acquisition. It was hypothesized that there would be a positive linear relationship between the tendency to process information deeply and/or elaboratively and the ability to acquire vocabulary, and that both of these would be related to actual vocabulary knowledge.

Subjects. The subjects were pre-service education majors and inservice teachers enrolled as graduate students in education at a medium sized college in the rural west. They were selected on the basis of convenience sampling in that they were enrolled in classes taught by the investigators. However, with the exception of the one class for secondary English teachers, the assignment to classes was arbitrary and there is no reason to believe that these students were atypical of other education students at the university.

Instrumentation. The following three tests were used: Schmeck's (1983) Learning Styles Inventory (LSI), the Farr Assessment of Vocabulary Acquisition (FAVA), and a vocabulary test used to predict performance on the Graduate Record Exam. These were administered to the students as part of the regular class proceeding with the intention of using the instruments to demonstrate different principles taught in the classes. In all, seven different classes were tested, involving 135 subjects, grouped according to type of class. Three analyses of the data were conducted: Group 1, secondary English majors, Group 2, elementary education majors, and Group 3, Master's students in education.

Schmeck's LSI was chosen because it represents a method of assessing information processing based on personal report and thus is not construed by subjects to be a "test." At the same time, it purports to measure an individual's use of learning strategies, some of which coincide with the type of strategies indicated by Werner and Kaplan and van Daalen-Kaptiejns and Elshout-Mohr. Of particular interest are the two classifications of strategies designated by Schmeck as deep processing and elaborative processing. Specifically, items in the deep processing category reflect the ability to decontextualize which was indicative of the performance of high verbals in the Werner/Kaplan paradigm. Schmeck reported similar findings. For more information on this instrument, the reader is referred to Schmeck (1983).

Because the latter two instruments were developed by the principal investigator, discussion of reliability and validity evidence is warranted. Different administrations of the FAVA have resulted in Kuder-Richardson-20 estimates of internal consistency

reliability ranging from a low of .68 to a high of .87 (Farr & Moore, 1989; Farr, 1991). KR-20 estimates of the internal consistency reliability of the vocabulary test scores range from .76 to .81 (Farr, 1991).

Unlike reliability evidence which can be garnered rather easily through statistical analysis, validity evidence is garnered arduously through a variety of approaches. Space does not permit a lengthy discussion of all of the approaches here, but two items are of importance. One, a case can be made that the FAVA does assess process to the extent that, in order to answer the questions correctly, the subjects have to surmise the meaning of the neologisms from the context. Additionally, this procedure has been used by other reputable researchers (Werner and Kaplan, 1967; Cook, Heim, & Watts, 1963). More convincingly, the test scores have been related to several other instruments in an effort to establish both convergent and divergent evidence. The FAVA correlates moderately with the vocabulary test as expected (r ranging from .49 to .77). Individuals with high ability to acquire vocabulary in context should do well on a vocabulary test, but the correlation should be less than perfect due to differential exposure to vocabulary and to the arbitrary choice of words to be included on any specific test. Also, the FAVA, purported to measure ability to learn other than verbal content, correlates moderately with quantitative measures, whereas the vocabulary test does not. For additional information on the two verbal instruments, see Farr and Moore (1989) and Farr (1991).

Results

Pearson correlation coefficients were found as follows for Groups 1 ($n=22$), 2 ($n=29$), and 3 ($n=84$), respectively: between deep processing and acquiring vocabulary in context, .45, .63, ns; between deep processing and vocabulary, .38, .79, ns; between elaborative processing and vocabulary, .41, .51, .48; between elaborative processing and acquiring vocabulary in context, ns, .48, ns.

These results provide weak support for the hypothesis. Although all of the correlations were not significant, a sufficient number of them were to suggest that there is a relationship between adults' ability to acquire vocabulary in context and the way they process information.

To confirm this, regression analyses were performed using the SAS General Linear Models Procedure. These analyses were performed individually because the data were gathered at different times. Two of the three analyses indicated the predictor variables used in the study, learning processes and ability to acquire vocabulary in context, did explain a portion of the variance in the criterion variable, vocabulary. The R-squared values for the three studies were as follows: $R = .47$, $F 1.61$, ns; $R = .81$, $F 18.98$, $p < .01$; $R = .25$, $F 2.79$, $p < .05$.

Interestingly, the R-squared value that was not significant was the one for Group 1, the English majors. This would be consistent with Marshalek's contention that at some level other factors are more important. These factors would include, but not

be restricted to, word abstractness, word frequency, item formats, and task requirements.

In both regressions with significant F values, beta weights for the predictor variables indicated that the two variables which contributed most to successful prediction were 1) the ability to acquire vocabulary in context (i.e., scores on the FAVA), and 2) deep processing.

Educational Importance

Because vocabulary is not only reflective of ability to learn, it affects learning, the implications for adult education are great. One implication is that cultural context must be taken into account when assessing vocabulary. If a student does not exhibit an appropriate vocabulary, it may be because s/he has not been exposed to the words common to the formal school setting. Alternatively, it may be because s/he lacks the reasoning ability to acquire word meaning from context. In the former case, it may be necessary to integrate the student's cultural experiences into the school setting and/or to provide a context for learning. In the latter case, it is imperative that reasoning skills be explicitly taught. Specifically, it may be necessary to teach directly how to use context cues for ascertaining the meaning of new words.

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